

**APPENDIX 12**  
**CLEAN WATER IN HOMES**  
**IN BORDER AREA MUNICIPALITIES PROGRAM**  
**OJINAGA, CHIHUAHUA**

Following is a summary report on the Clean Water in Homes in Border Municipalities Program, the full results of which are available from the agencies that operate the project. A list of program contacts is provided at the end of this summary.

**BACKGROUND** The Clean Water in Homes Program was initiated in April 1991, at the request of the Mexican government, to provide clean water to all of the country's communities. Based on the definition of minimum standards of quality, wastewater treatment, and disposal, the program works to guarantee a volume and quality of water suitable for different uses: human consumption, agricultural irrigation, and industrial and recreational use. The Comisión Nacional del Agua (CNA, or National Water Commission and the Secretaría de Salud (SSA, or Secretariat of Health jointly participate in the implementation and development of the program.

The program succeeded in substantially reducing the incidence of gastrointestinal illnesses, particularly cholera, in Mexico. A gradual decrease in reported incidences of cholera was achieved over time, from 16,430 cases in 1995 to 2,359 cases in 1997, and only 9 cases confirmed in 1999.

In 1997, the CNA and the SSA implemented the Clean Water Program in the states of Chiapas, Oaxaca, and Yucatan to avoid a resurgence of gastrointestinal illnesses. In highly impoverished areas, cases of cholera and elevated mortality rates as a result of diarrhea-related illnesses were being reported.

**CLEAN WATER IN HOMES IN BORDER MUNICIPALITIES PROGRAM** The Clean Water in Homes in Border Municipalities Program came about as a proposal put forth by the Water and Environmental Health workgroups of the U.S. Border XXI Program. The proposal gained the support of the National Coordinators of that program at their binational meeting in San Diego, California in March 1998.

The Clean Water in Homes in Border Municipalities Program began in July 1998 in the state of Chihuahua. The agencies jointly participating in the program are the main offices and state-level offices of the SSA, the Secretaría del Medio Ambiente, Recursos Naturales, y Pesca, (SEMARNAP, or Secretariat of Environment, Natural Resources, and Fisheries), CNA, the Fundación de México-Estados Unidos para la Ciencia, (FUMEC, or Mexico-United States Foundation for Science) at the state and municipal authority level, and community representatives. The North American Development Bank (NADB) also participates in the program.

The program is similar to that of the Clean Water Program. It focuses on basic sanitation and environmental education in border-area municipalities in Mexico. In particular, the program targets municipalities characterized by rural communities with elevated mortality indices related to gastrointestinal illnesses. The program also focuses on municipalities with deficient or nonexistent water supply and basic sanitation infrastructure. In addition, the program considers municipalities that have no short-term plans to provide funds for the creation of infrastructure to alleviate such problems.

**OVERALL OBJECTIVE** The overall objective of the program is to reduce morbidity and mortality indices attributable to gastrointestinal infections in the northern border area of Mexico through: (1) improvement of water quality (both at the level of water supply systems and at the residential level); (2) sanitary protection of water sources; (3) promotion of disinfecting techniques; (4) promotion of appropriate waste disposal techniques; (5) promotion of the hygienic handling of food; (6) conduct of community discussions; and (7) application of simple actions to foster basic sanitation in schools.

#### **STRATEGIES**

- Through the use of a family questionnaire, evaluate practices and attitudes of the population in relation to basic sanitation.
- Gather drinking water samples to determine bacteriological quality.
- Promote basic sanitation practices in communities and schools by holding discussion sessions, showing the video series "*Los Consejos de Doña Lupita*" and distributing brochures.<sup>1</sup>
- Promote the use of potable water disinfecting techniques, supported by the distribution of bottles of colloidal silver to households.
- Through the use of surveys, determine awareness of colloidal silver as a household water disinfectant.
- Evaluate sanitary water supply sources and systems.
- Evaluate waste and wastewater disposal sites.
- Examine water quality through the physicochemical and bacteriological characterization of water to be used for human consumption.
- Develop an integral, basic sanitation diagnosis for communities, including proposed solutions to specific sanitation problems.
- Evaluate the program's effectiveness.

**DEVELOPMENT** To date, three stages of the program have been completed. During the first stage (August 31-September 5, 1998), the program was implemented. During the second stage (April 19-23, 1999), the program's efficiency was evaluated with respect to the use of colloidal silver as a household water disinfectant. The third stage (September 27-30, 1999) was carried out to determine the impact of the activities that had been undertaken.

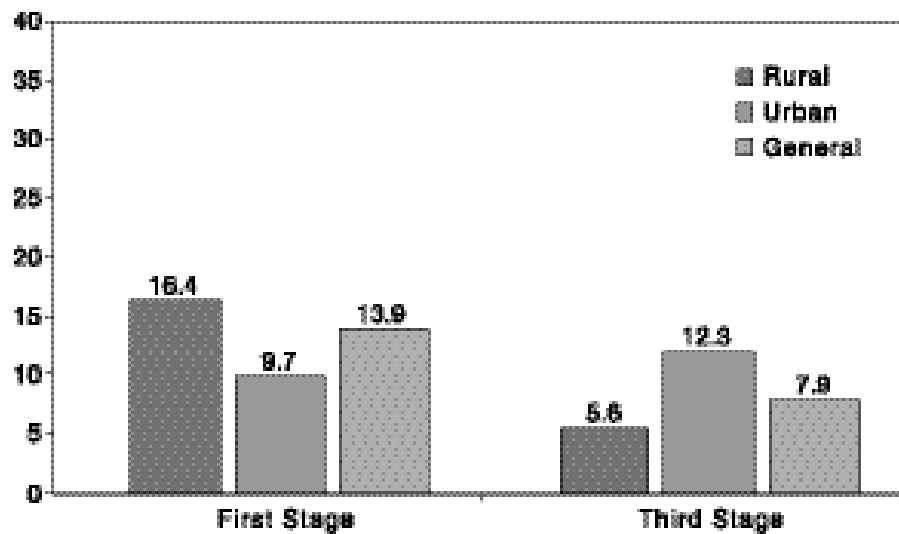
Throughout each stage, an average of 976 families (3,477 inhabitants) benefited directly from the application of the program. However, interaction between rural and urban populations allowed extension of the program's benefits to the municipality of Ojinaga's total population of 20,100.

---

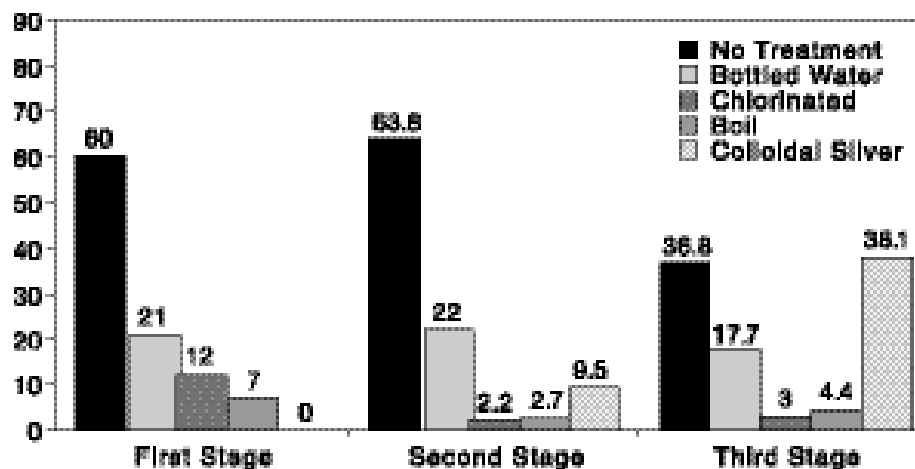
<sup>1</sup> Los Consejos de Doña Lupita is a series of 12 videos, each 3 minutes long to promote essential aspects of basic sanitation.

**RESULTS** Following are the results of the surveys conducted in both rural locales and urban neighborhoods during the first and third stages of the program:

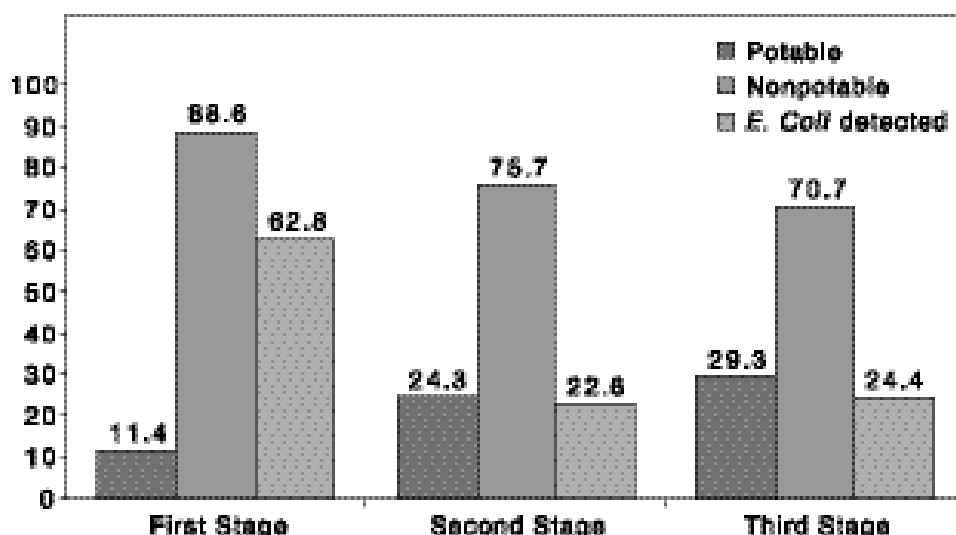
1. A 6 percent reduction in reported cases of diarrhea-related illnesses. This figure will be validated when local statistics and the official annual morbidity rates from the SSA are published.



2. A 27 percent increase in the practice of disinfecting potable water with colloidal silver as the most commonly used method (38 percent in the third stage).



3. A 31 percent increase in the practice of disinfecting raw vegetables.
4. An 18 percent increase in the amount of produce fit for human consumption.



The most significant changes occurred in rural areas. In the initial stages of the program, overall coliform was detected in 100 percent of the samples requested, while *E. coli* was detected in 78 percent of the samples. More recently, in the third stage, overall coliform was detected in 82 percent of the samples, and *E. coli* in only 37 percent of the samples.

The program effectively educated both the population and municipal and state authorities on the importance of basic sanitation as a health benefit. As a result of funding, certain infrastructure projects accelerated: (1) sanitary land-fill operations began in the city of Ojinaga, Chihuahua; (2) a detailed design was prepared for a wastewater treatment plant; and (3) the oxidation basin was enlarged to prevent and control water contamination. In addition, the water supply systems for Barrio de los Montoya and Valverde were renovated; a new system, now in operation, was built for La Colmena; and a sewage program was implemented in Valverde.

In each stage of the program, pertinent recommendations were made to the municipal authorities and local water officials in the various areas visited. The immediate recommendations to the proper authorities demonstrate the potential success of the program before it is completed.

**ADDITIONAL EVALUATION** Before and during its implementation, the program was evaluated by the Fundación de México-Estados Unidos para la Ciencia, (FUMEC, or Mexico-United States Foundation for Science). The surveys were carried out in four stages to identify the conditions related to the population's basic sanitation (water service, management of potable water, knowledge about disinfectants for water and vegetables, disposal of excreta, and the incidence of diarrhea-related illnesses). The results coincided with the results of a survey taken by the program's operating personnel.

The most notable results, according to the verbal information furnished by the population interviewed between the first and the fourth survey stages, were:

1. In general terms, it can be said that the incidence of gastrointestinal illnesses dropped from 21 percent (before the program's implementation) to 6 percent, as of the fourth survey stage.
2. With respect to the population's knowledge about water disinfectants, 41 percent of the population said they knew about some disinfectant before the program's implementation, while that proportion increased by 15 percent by the time of the last evaluation.
3. In relation to persons practicing water disinfection, a general increase of 20 percent was observed between the evaluation made before implementation of the program and the fourth evaluation.

**CONCLUSIONS** During its short test period, the Clean Water in Homes in Border Area Municipalities program proved to be an effective instrument for reducing gastrointestinal illness indices among the population, through integral sanitation actions and health education.

Satisfactory results were achieved in a short time and at relatively low cost by (1) addressing issues dealing with potable water and food disinfection, (2) promoting awareness of basic sanitation, and (3) making an effort to heighten consciousness of these matters among municipal authorities.

The program also demonstrated the merits of inter-institutional cooperation among the various agencies in all levels of Mexico's government, as well as with private foundations and financial institutions.

The information presented above demonstrates the program's feasibility as an instrument in meeting sanitation needs in disadvantaged communities in the Mexican border region, especially in rural communities. It is, therefore, reasonable to suggest that the program be established as a continuing and committed project in a new Border XXI phase starting in 2001. Doing so will allow extension of the program to other communities in Mexico's border region.